AMENDMENT TO THE SPECIFICATION

Title of the invention: **SYSTEM AND METHOD FOR PROVIDING IMAGE FORMING COMPOSITION ON A SUBSTRATE**

[**0006**] We have determined that the use of a drop on demand print head which operates at frequencies greater than 1 kHz enables the size of the droplets being printed to be reduced, which reduces the problems of colour bleed and enhances the definition of the printed image or pattern without reducing the print rate below commercially practical levels. Furthermore, we have found that it becomes possible to omit individual printed droplets from the printed pattern and thus print a blank within the image which is not visually perceptible but which acts to provide a gap within the printed strands to act as a barrier to colour bleeding. Such a gap may also be printed as a black line defining the edges of areas printed with different colours, which enhances the perceived definition of the printed image or pattern.

[**0008**] In order to obtain bright colour quality and achieve a consistent depth of colour through the textile pile at high print speeds, it is preferred to have the option to apply the ink by opening the printing nozzle orifice and keep it open for a period of time sufficient to form a stripe of a desired length. This technique is referred to as dosing. This process is different to producing a multiplicity of dots in a linear print fashion and ensures continuous, consistent colour dosage through the textile fibres.

[**0014**] Accordingly, the present invention provides a method for applying an image forming composition to one or more sides of a mesh fabric using a drop on demand ink printer, characterised in that the printer is operated at a fluid pressure of between 1 and 3.5 bar. Preferably the image forming composition has a viscosity of less than 100 cp and further preferably the image forming composition viscosity is in the range of 5 to 20 cp. ~~t~~The use of a pressurised fluid provides significant advantage in textile printing when compared with the more commonly utilised in impulse jet systems. ~~v~~Variable positive pressure provides the ability to jet higher viscosity inks such as that typically used in textile printing and prevents nozzle depriming problems often suffered by impulse jet products.

[**0021**] Furthermore, we have found that the above design of valve can be held in the open position for prolonged periods to print continuous lines on the substrate (dosing). In practice this often leads to the valves burning out due to the high currents applied to the coil to move the plunger from its initial rest position into the valve fully open position. We have found that the amplitude of the current flowing through the coil required to hold the plunger in the valve open position is surprisingly much less, typically 80 to 50% less, than the current required to move the plunger initially away from its rest position. By applying a current pulse which has an initial amplitude sufficient to move the plunger from its rest position to the valve open position and then reducing this amplitude to a lower value for the remainder of the pulse, it is possible to hold the valve open for prolonged periods so as to print lines of ink on the substrate. ~~T~~This is essential for best quality textile printing where a dosing action is used.

[**0068**] As indicated above, the operation of the valve is controlled by a computer 20 in response to a CCD camera or array 21 or other sensors 22 detecting the quality of the printed dots and/or other factors such as temperature, voltage, frequency of operation of the valve which also affect the printed dot quality. Thus, the computer 20 determines which valve to open in the array of FIG. 2 and for how long so as to print a drop of the desired size at the desired position on the substrate 23 passing the print head 24. At slow frequencies of operation, for example below 1 kHz, this will usually result in a good quality dot being printed on the substrate. However, as the frequency increases, say to 2 kHz or more, the quality of the printed dot may suffer, for example due to the sudden closure of the valve causing the formation of satellite dots. The computer can respond to this by detecting from the CCD array that such satellite dots are being formed and causing the shape of the pulse of electric current applied to the coil to change so that the movement of the plunger at each extreme of its travel is reduced so as to reduce the sudden-ness of the closure of the valve by causing the plunger to soft land against the face of the jewel nozzle or end wall of the valve head chamber. Alternatively, the computer can respond to the instruction to print at high frequencies by reducing the open time of the valve by reference to a look up table 25 which carries a list of reductions in open time for a range of operating frequencies. Similarly, the software controlling the operation of the print head can detect when a valve has been idle for any length of time and provide, through another look up table, a signal to increase the open time of the ~~vale~~ valve for the initial dots printed by that valve to compensate for any drying out of the ink within the valve and/or at the nozzle orifice. In such cases, it is preferred that the information between the computer and the look up table be exchanged as bytes sized signals so that up to 256

possible permutations of open time and operating frequency can be accommodated in a single signal.